

Introduction to Machinery Principles	p. 1
Electrical Machines, Transformers, and Daily Life	p. 1
A Note on Units and Notation	p. 2
Rotational Motion, Newton's Law, and Power Relationships	p. 3
The Magnetic Field	p. 8
Faraday's Law--Induced Voltage from a Time-Changing Magnetic Field	p. 28
Production of Induced Force on a Wire	p. 32
Induced Voltage on a Conductor Moving in a Magnetic Field	p. 34
The Linear DC Machine--A Simple Example	p. 36
Real, Reactive, and Apparent Power in AC Circuits	p. 47
Summary	p. 53
Transformers	p. 65
Why Transformers Are Important to Modern Life	p. 66
Types and Construction of Transformers	p. 66
The Ideal Transformer	p. 68
Theory of Operation of Real Single-Phase Transformers	p. 76
The Equivalent Circuit of a Transformer	p. 86
The Per-Unit System of Measurements	p. 94
Transformer Voltage Regulation and Efficiency	p. 100
Transformer Taps and Voltage Regulation	p. 108
The Autotransformer	p. 109
Three-Phase Transformers	p. 116
Three-Phase Transformation Using Two Transformers	p. 126
Transformer Ratings and Related Problems	p. 134
Instrument Transformers	p. 140
Summary	p. 142
Introduction to Power Electronics	p. 152
Power Electronic Components	p. 152
Basic Rectifier Circuits	p. 163
Pulse Circuits	p. 171
Voltage Variation by AC Phase Control	p. 177
DC-to-DC Power Control--Choppers	p. 186
Inverters	p. 193
Cycloconverters	p. 209
Harmonic Problems	p. 218
Summary	p. 221
AC Machinery Fundamentals	p. 230
A Simple Loop in a Uniform Magnetic Field	p. 230
The Rotating Magnetic Field	p. 238
Magnetomotive Force and Flux Distribution on AC Machines	p. 246

Induced Voltage in AC Machines	p. 250
Induced Torque in an AC Machine	p. 255
Winding Insulation in an AC Machine	p. 258
AC Machine Power Flows and Losses	p. 261
Voltage Regulation and Speed Regulation	p. 262
Summary	p. 264
Synchronous Generators	p. 267
Synchronous Generator Construction	p. 267
The Speed of Rotation of a Synchronous Generator	p. 272
The Internal Generated Voltage of a Synchronous Generator	p. 273
The Equivalent Circuit of a Synchronous Generator	p. 274
The Phasor Diagram of a Synchronous Generator	p. 279
Power and Torque in Synchronous Generators	p. 280
Measuring Synchronous Generator Model Parameters	p. 283
The Synchronous Generator Operating Alone	p. 288
Parallel Operation of AC Generators	p. 299
Synchronous Generator Transients	p. 319
Synchronous Generator Ratings	p. 326
Summary	p. 336
Synchronous Motors	p. 346
Basic Principles of Motor Operation	p. 346
Steady-State Synchronous Motor Operation	p. 350
Starting Synchronous Motors	p. 364
Synchronous Generators and Synchronous Motors	p. 371
Synchronous Motor Ratings	p. 372
Summary	p. 373
Induction Motors	p. 380
Induction Motor Construction	p. 380
Basic Induction Motor Concepts	p. 384
The Equivalent Circuit of an Induction Motor	p. 388
Power and Torque in Induction Motors	p. 394
Induction Motor Torque-Speed Characteristics	p. 401
Variations in Induction Motor Torque-Speed Characteristics	p. 416
Trends in Induction Motor Design	p. 426
Starting Induction Motors	p. 430
Speed Control of Induction Motors	p. 434
Solid-State Induction Motor Drives	p. 444
Determining Circuit Model Parameters	p. 452
The Induction Generator	p. 460
Induction Motor Ratings	p. 464

Summary	p. 466
DC Machinery Fundamentals	p. 473
A Simple Rotating Loop between Curved Pole Faces	p. 473
Commutation in a Simple Four-Loop DC Machine	p. 485
Commutation and Armature Construction in Real DC Machines	p. 490
Problems with Commutation in Real Machines	p. 502
The Internal Generated Voltage and Induced Torque Equations of Real DC Machines	p. 514
The Construction of DC Machines	p. 518
Power Flow and Losses in DC Machines	p. 524
Summary	p. 527
DC Motors and Generators	p. 533
Introduction to DC Motors	p. 533
The Equivalent Circuit of a DC Motor	p. 535
The Magnetization Curve of a DC Machine	p. 536
Separately Excited and Shunt DC Motors	p. 538
The Permanent-Magnet DC Motor	p. 559
The Series DC Motor	p. 562
The Compounded DC Motor	p. 568
DC Motor Starters	p. 573
The Ward-Leonard System and Solid-State Speed Controllers	p. 582
DC Motor Efficiency Calculations	p. 592
Introduction to DC Generators	p. 594
The Separately Excited Generator	p. 596
The Shunt DC Generator	p. 602
The Series DC Generator	p. 608
The Cumulatively Compounded DC Generator	p. 611
The Differentially Compounded DC Generator	p. 615
Summary	p. 619
Single-Phase and Special-Purpose Motors	p. 633
The Universal Motor	p. 634
Introduction to Single-Phase Induction Motors	p. 637
Starting Single-Phase Induction Motors	p. 646
Speed Control of Single-Phase Induction Motors	p. 656
The Circuit Model of a Single-Phase Induction Motor	p. 658
Other Types of Motors	p. 665
Summary	p. 677
Three-Phase Circuits	p. 681
Generation of Three-Phase Voltages and Currents	p. 681
Voltages and Currents in a Three-Phase Circuit	p. 685
Power Relationships in Three-Phase Circuits	p. 690

Analysis of Balanced Three-Phase Systems	p. 693
One-Line Diagrams	p. 700
Using the Power Triangle	p. 700
Coil Pitch and Distributed Windings	p. 707
The Effect of Coil Pitch on AC Machines	p. 707
Distributed Windings in AC Machines	p. 716
Summary	p. 724
Salient-Pole Theory of Synchronous Machines	p. 727
Development of the Equivalent Circuit of a Salient-Pole Synchronous Generator	p. 728
Torque and Power Equations of Salient-Pole Machine	p. 734
Tables of Constants and Conversion Factors	p. 737

*Table of Contents provided by Blackwell's Book Services and R.R. Bowker. Used with permission.*